

# Hunters Point Shipyard

## Historical Radiological Assessment



## A Guide to the Findings



# Hunters Point Shipyard

San Francisco, California





## Introduction

Hunters Point Shipyard played an important role in scientific innovation and national security for more than 30 years. This role included shipyard operations using radioactive materials and radiological research focused on protection of people



*Shipyard safety awards ceremony. (1955)*

and ships from the effects of atomic and nuclear weapons. As a result of these past activities, radioactive materials were introduced to the shipyard's

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land and buildings and may have been discharged to San Francisco Bay. Every effort was made to use state-of-the-art protection standards, disposal methods and radiation detection tools at the time of the radiological operations. However, these standards and methods were not as strict, nor were the tools as sensitive, as they are today.

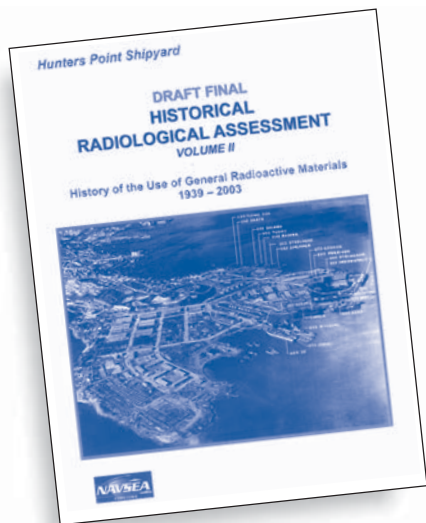
The Navy is in the process of cleaning up residual radioactive materials at

Hunters Point Shipyard so the land can be used for other purposes, such as commercial and residential development and open space. As part of this process, the Navy conducted a study called a Historical Radiological Assessment. The study concluded that only low-level radioactive materials have been found to date, and the public and the environment are, and will continue to be, safe.

# The Hunters Point Shipyard Historical Radiological Assessment

The Historical Radiological Assessment is a study about past radiological activities at Hunters Point Shipyard. Radiological activities involve the use of materials that emit radiation — energy that travels in the form of waves

or particles. One of the reasons it is called “historical” is because the study looks at the practices and level of knowledge at the time the activities took place. A Historical Radiological Assessment is used to identify where radioactive materials could be present so proper surveys can be conducted and, where necessary, appropriate cleanup work can be done. The Historical Radiological Assessment covers radiological activities from 1939 to 2003.



## What Is Radioactive Material?

*Radioactive materials emit energy in the form of waves or particles called radiation. Radioactive materials and radiation occur in nature. These materials are also used by the military and private industry and are present in common household items. Common items that use radioactive materials are smoke detectors, radioluminescent devices, lead paint analyzers, static eliminators, non-electrically powered exit signs and biological and chemical agent detectors. The current investigations at Hunters Point Shipyard are focused on materials left over from former radiological operations and disposal methods. While high levels of radioactive materials can be harmful to people and the environment, to date only low-levels of radioactive materials have been found at the shipyard.*

## Radiation Sources

Radiation at Hunters Point Shipyard came from three main sources: shipyard activities, decontaminating ships involved in atomic weapons testing, and research and development activities of the Naval Radiological Defense Laboratory.

### 1. Shipyard Activities

#### Refurbishment & Handling of Radioluminescent

**Devices** - Beginning in the late 1930s and continuing through the late 1960s, the Navy used paint usually mixed with radium for dials, deck markers, gauges and other surfaces that needed to be visible in the dark without electricity. Instruments and gauges with radioluminescent paint were refurbished at the shipyard. Excess devices and residues from these operations were disposed of in the landfills, a common industrial practice until the late 1960s. Paint

containing radium was sometimes poured down drains, which emptied into sewer pipes. In the 1950s, radioluminescent devices that used other radioactive elements such as strontium, tritium and promethium were used by the shipyard. These included deck markers, watches, compasses and other devices that were likely disposed of in the landfills.

## Impacted & Non-impacted Sites

*The primary goal of the Historical Radiological Assessment is to identify sites that are "impacted" by past radiological activities. An impacted site is one that has the potential for radioactive materials to be present and may require further action.*

*Impacted sites include:*

- *sites where radioactive materials were used or stored*
- *sites where known spills, discharges or other releases of radioactive materials may have occurred*
- *sites where radioactive materials might have been disposed or buried*

*A non-impacted site is one where, based on historical information and / or results from previous studies, there is no reasonable possibility that radioactive materials are present.*

## Radiation Sources *(cont.)*

**Gamma Radiography** - From the 1940s until closure in 1974, Hunters Point Shipyard conducted “gamma radiography.” Gamma radiography, similar to an X-ray, is used to take “pictures” of pipes or welds and is still in use today. The image would show whether any defects were present, similar to how an X-ray shows a broken bone. Gamma radiography devices containing small amounts of radioactive materials were licensed by the Atomic Energy Commission after 1954.

**Radiation Detection Instrument Calibration** - Since radioactive materials were used at Hunters Point Shipyard, the Navy monitored levels



and exposure with special detection instruments. To ensure the instruments were accurate, the instruments would be tested against a known quantity of radioactive material. This process was called “calibration” and the radioactive source and container a “calibrator.” After

*A Characterization Survey and Cleanup Action are recommended for Building 253.*

1954, the calibrators were licensed by the Atomic Energy Commission, which required routine testing of the radioactive sources for leakage of radioactivity. If leakage was found, the instrument would be removed from service until the source was repaired or replaced. If a source could not be repaired, it was disposed of as radioactive waste.

## 2. Operation Crossroads

In 1946, the Navy tested two atomic weapons in the lagoon of Bikini Atoll in the Marshall Islands. These tests were called “Operation Crossroads.”

The purpose of the tests was to study the effects of atomic weapons on Navy ships. More than 240 Navy vessels participated in the test as either target or support ships. Target ships were placed at different locations near the target site so the blast effects could be measured. Support ships were located far enough away from the blast to avoid damage but close enough to the target ships to gather scientific data.



*The USS Iowa in drydock at Hunters Point Shipyard in 1951.*

The first detonation, Shot Able, did not create much radioactive debris and the ships were not heavily impacted by radiation as the weapon detonated 1/2-mile off target. The second detonation, Shot Baker, was detonated 60 feet below the ocean surface and resulted in a 90-foot wave of water containing radioactive debris. This water and debris impacted target ships, support ships and a nearby lagoon and island. As a result, hundreds of ships needed to be decontaminated. After experimentation in Bikini Lagoon, it became apparent that more extensive decontamination at a Navy shipyard was required, with the most heavily contaminated ships sunk at Kwajalein Atoll. The Navy chose Hunters Point Shipyard as the principal location for the decontamination of Operation Crossroads ships because Navy technical knowledge in radiological science was centered there and the site was close to scientific expertise at the University of California at Berkeley and Stanford University. Seventy-nine ships were sent for decontamination to Hunters Point Shipyard. Decontamination of the ships' hulls was accomplished by sandblasting. Decontamination of the evaporators and water purification systems used an acid wash. While most of the decontamination material was collected for disposal at sea, some of it was discharged into San Francisco Bay. In addition, the target ships that were towed back had radioactively contaminated fuel. This fuel was disposed of by burning in the shipyard shore power plants.



## Radiation Sources *(cont.)*

### 3. Naval Radiological Defense Laboratory

The use of atomic weapons at the end of World War II brought many changes in national defense. To address these changes, the Navy created an organization to study the effects of atomic weapons on ships and personnel. Hunters Point Shipyard was selected as the headquarters of this organization because of its experience with the ships from Operation Crossroads. This organization eventually became a separate command at Hunters Point Shipyard named the Naval Radiological Defense Laboratory. The laboratory's research initially focused on radiological studies and experimentation for the protection of worker's

**The Navy created an organization to study the effects of atomic weapons on ships and personnel.**

health and safety. The laboratory also conducted experiments on the biological effects of radiation in order to develop protective measures and equipment.

The laboratory was a leading research facility in the country for the study of atomic weapons and safety until its closure in 1969. The laboratory also managed sea disposal of radioactive waste from its work and from other military bases, educational

institutions and research laboratories until 1960. These waste products were packaged at Hunters Point Shipyard, loaded onto barges and shipped to the Farallon Islands for ocean disposal.



*Building 815 is a seven-story flat-roofed steel and concrete structure built in the early 1950s as the Naval Radiological Defense Laboratory's main research facility and headquarters, which occupied the building from 1955 through its closure in 1969. (1955)*

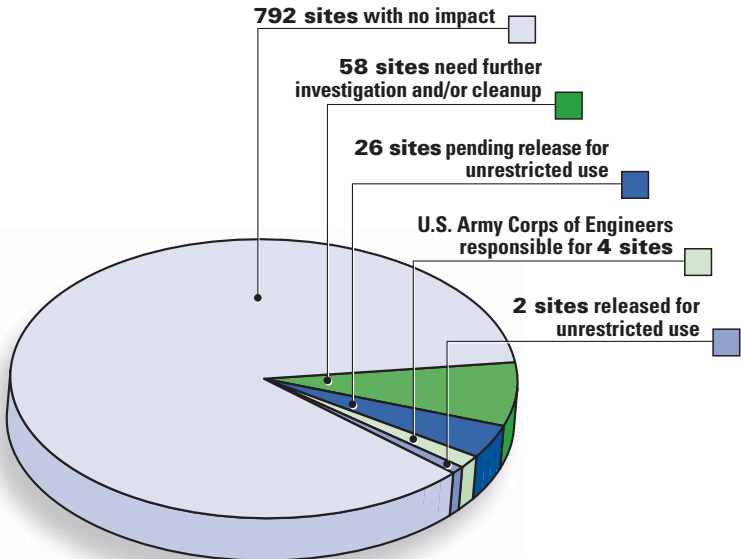


## Impacted Sites

The Historical Radiological Assessment identified a total of 882 Hunters Point Shipyard sites. Of these, 90 were identified as impacted or a site where radioactive materials may have been used, stored or disposed in the past. Based on information available to date, the Historical Radiological Assessment determined that:

- None of the sites identified as impacted require restricted access or emergency cleanup action.
- Radioactive materials have not been released to areas outside the shipyard.
- Potentially contaminated soil, structures and drainage systems do not present a concern for groundwater or airborne contamination.
- Based on what is known and what has been found to date, only low-level radioactive materials are expected to exist.

## Historical Radiological Assessment Findings: 882 Sites Assessed



## Impacted Sites (cont.)

The Historical Radiological Assessment recommends future action for all but two of the impacted sites. Two of the sites require no further action as they have been previously released by the Navy and California regulators. Of the



*Shipyard workers repair the USS Ingraham during World War II. (1945)*

remaining 88 sites, some will require cleanup actions, some require investigation and some only require review of a site clearance report. During any investigation or cleanup action, the Navy will ensure that the public and the environment continue to be safe. A list of all impacted sites is also available in Section 8.0 of the Historical Radiological Assessment, which is available online at: **[http://www.efds.w.navy.mil/Environmental/pdf/HRA\\_FinalDraft/Draft\\_Final\\_HRA.pdf](http://www.efds.w.navy.mil/Environmental/pdf/HRA_FinalDraft/Draft_Final_HRA.pdf)** and at the Information Repositories listed on page 13.

Examples of impacted sites and the Historical Radiological Assessment's recommendations are described here. For a description of radiological surveys, see *What's Next For Hunters Point Shipyard?* on page 11.

### ■ Shipyard Activities: *Base Bay Fill Area "IR-02"*

IR-02 is a fill area located in the southeastern portion of the shipyard. Various ship repair and maintenance wastes were disposed from the late 1930s through the 1960s. Disposing of wastes in this way was a common industrial practice during the World War II era. Among these wastes were gauges, dials, watches and ships' deck markers that contained radioluminescent paint. Studies conducted in 1988 and 1996 found such devices on and below the ground surface. All devices found on the surface were removed during the investigations.

The Historical Radiological Assessment recommends conducting a Characterization Survey to find out what kinds and how much radioactive materials remain at IR-02. This survey will help the Navy choose the best cleanup method.

## ■ **Operation Crossroads: *Ships' Berths and Drydocks***

Hunters Point Shipyard has 50 docking areas for ships, called berths. These berths were used to anchor ships that came back from Operation Crossroads. Ships that required extensive decontamination were moved to drydock for sandblasting.

It is possible that residual radioactive debris remains within the drydocks, berths and / or surrounding bay sediments. Two of the six drydocks are recommended for a survey to ensure that no residual radioactive materials remain.

Recommendations for the other four drydocks are to review previous survey

information. Also, the Historical Radiological Assessment recommends that bay sediments in the vicinity of all ship berths be investigated. Because no records were found to show which berths were used for anchoring the ships, the Historical Radiological Assessment recommends performing a Final Status Survey at all berths before releasing them for unrestricted use.



*Hunters Point Shipyard drydocks were important for ship repair. (1953)*

## ■ **Naval Radiological Defense Laboratory: *Former Building 506 Site***

The Naval Radiological Defense Laboratory's headquarters and main laboratory were housed at Building 506 until 1955. The building was demolished in the late 1970s. The lab held equipment for testing and storing radioactive materials and conducting radiological research and experiments. A radiological survey of the building conducted in 1978 found radioactive materials, which were cleaned up to standards of the time. During the preparation of the Historical Radiological Assessment, historical drawings were reviewed that showed the building's drainage system and waste disposal system which was not studied previously.

A Scoping Survey is recommended to see if radioactive materials exist in the underground piping.

## Who Regulates Environmental Cleanup?

*Several government agencies oversee environmental cleanup activities at Hunters Point Shipyard. Each brings expertise to the cleanup and has its own areas of responsibility:*

- **The Environmental Protection Agency (EPA)** is a federal agency that was established in 1970 to protect human health and the environment. At Hunters Point Shipyard, EPA regulates the overall environmental cleanup program, except for buildings impacted by radioactive materials. Cleanup of radioactive materials in buildings is overseen by the State of California.
- **The State of California** works with EPA and the Navy to be sure that the cleanup meets required standards. Environmental oversight is divided among three departments:
  1. **Department of Health Services** - oversees cleanup of radioactive materials in buildings.
  2. **Department of Toxic Substances Control** - similar to EPA's role at Hunters Point Shipyard, oversees the Navy's environmental cleanup program.
  3. **Water Resources Control Board** - enforces California's water quality regulations.

*All work conducted at Hunters Point Shipyard follows state and federal health and safety standards to protect people and the environment. These regulatory agencies and standards will ensure that radioactive materials at Hunters Point Shipyard are found and cleaned up.*





## What's Next for Hunters Point Shipyard?

The 90 impacted sites will be assessed following the recommendations in the Historical Radiological Assessment. The Navy has been studying these sites even while the report was being created, and some sites are close to being “released” for unrestricted use. A site is released when it has been cleaned up or found to be safe for people and the environment. The types of work that will be done at the sites are:

**A site is released when it has been cleaned up or found to be safe for people and the environment.**

### Scoping Survey:

Historical records show that radioactive materials may exist at a site and a survey must be performed. This survey will show whether radioactive materials are present or not and, if so, provide general data about how much and what kind exist. If radioactive materials are present, a Characterization Survey will be done.

### Characterization Survey:

Records or previous surveys show that radioactive materials exist at a site and a study must be performed to see how much and what kind of radioactive materials are present. This study also helps scientists choose the best cleanup method to be used.

# What's Next for Hunters Point Shipyard? (cont.)

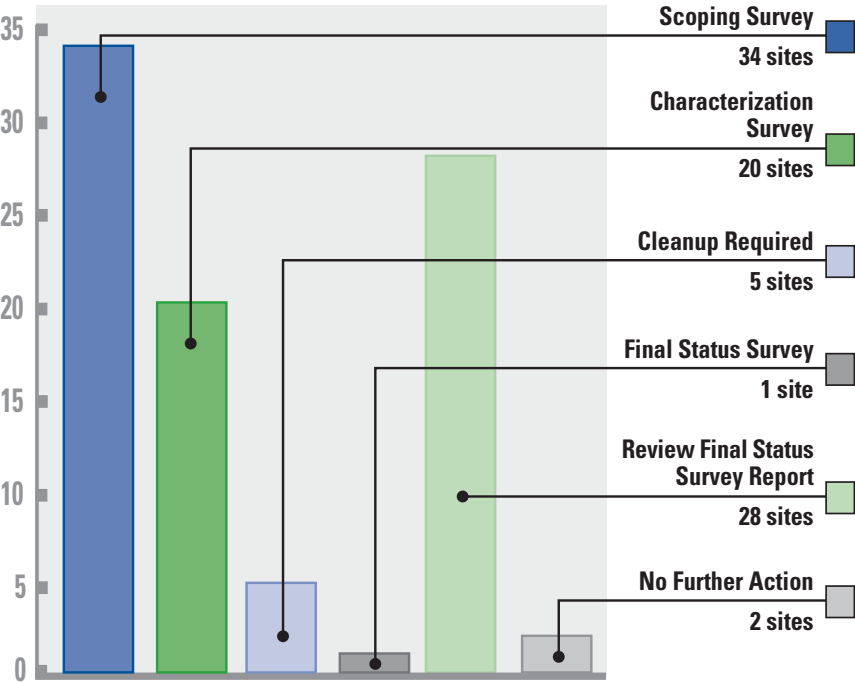
## Cleanup (Remediation):

The types and amount of radioactive materials are known and will be removed to comply with state and federal regulations.

## Final Status Survey:

Historical records, studies and / or cleanup show that the site is free of harmful radiation. A survey must be conducted to verify that a site can be released for unrestricted use.

## Historical Radiological Assessment Recommendations



## Want More Information?

The Draft Final Hunters Point Shipyard Historical Radiological Assessment and other project documents are available for public review at the following Information Repositories:

### **City of San Francisco Main Library**

Government Information Center, 5th floor  
100 Larkin Street, San Francisco, CA 94102  
(415) 557-4500

### **Bayview / Anna E. Waden Branch Library**

5075 Third Street, San Francisco, CA 94124  
(415) 715-4100

For more information about environmental cleanup at Hunters Point Shipyard, please refer to:

### **Hunters Point Shipyard Environmental Web Site:**

<http://www.efdswn.navy.mil/Environmental/HuntersPoint.htm>

The Historical Radiological Assessment is posted on this site and can also be accessed directly by keying in:

[http://www.efdswn.navy.mil/Environmental/pdf/HRA\\_FinalDraft/Draft\\_Final\\_HRA.pdf](http://www.efdswn.navy.mil/Environmental/pdf/HRA_FinalDraft/Draft_Final_HRA.pdf)

For additional information about environmental cleanup at Hunters Point Shipyard, please contact:

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San Francisco, California



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San Francisco History Center, San Francisco Public Library.



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